AMENDMENTS TO THE CLAIMS

1. An actuating device ~~for manually actuating~~configured to manually actuate a driving and steering ~~means~~ mechanism for a wheeled, power driven object or vehicle, said actuating device comprising:

a base member;~~,~~

an actuating member having gripping means and being supported by the ~~-~~base member so as to be displaceable ~~thereon~~ relative to the base member in ~~along~~ at least one plane;~~,~~

at least first and second force transducers, the first transducer being arranged to receive a force component manually applied to the actuating member in a ~~predetermined~~ first direction ~~only, along~~within said plane, and the second force transducer being arranged to receive a force component manually applied to the actuating member in a ~~predetermined~~ second direction ~~only~~, the second direction being transverse~~ly~~ to the first direction ~~along~~ and within said plane, wherein

each of said at least first and second force transducers ~~being~~ are adapted to generate an output signal ~~to~~ for the driving and steering ~~means~~ mechanism responsive to the strength of the force component received.

2. An actuating device according to claim 1, wherein said ~~predetermined~~ first and second directions extend at mutual right angles.

3. An actuating device according to claim 1 ~~or 2~~, wherein said first ~~predetermined~~ direction extends in the normal direction of travel of the vehicle.

4. An actuating device according to ~~any of the claims 1-3~~claim 1, wherein said gripping means comprises a pair of ~~mutually spaced~~ gripping handles, ~~which are fixedly~~ the gripping handles being mounted on the actuating member and symmetrically arranged about a line along the first direction midway between the gripping handles~~in relation to said first predetermined direction~~, said first force transducer and a similar third force transducer being arranged symmetrically about a line along the first direction midway between the first and third force transducers~~in relation to the said first predetermined direction~~, said third force transducer

~~being arranged like the~~ and said first force transducer being arranged to receive a force component manually applied to the actuating member in said ~~predetermined~~ first direction~~. only.~~

5. An actuating device according to ~~any of the claims 1-4~~claim 1, wherein each force transducer is ~~fixedly~~ mounted ~~in relation~~ to the base member, each force transducer having a force transmitting member extending into and engaging with the walls of an associated recess in the actuating member, said recess being shaped such that substantially only a force component in the ~~said predetermined~~ direction associated with the transducer may be transmitted from the actuating member to the force transducer via said transmitting member.

6. An actuating device according to ~~any of the claims 1-5~~claim 1, wherein the force transducers each comprise a strain gauge~~s.~~

7. An actuating device according to claim 6, wherein each force transducer comprises a cantilever beam having one or more strain gauges mounted thereon, ~~the force component from~~ the actuating member being ~~applied~~ configured to apply a force to the free end of the beam so as to generate bending stresses in the beam~~therein.~~

8. An actuating device according to ~~any of the claims 1-7~~claim 1, wherein the actuating member is ~~freely~~ configured to float~~ing~~ on a liquid film or layer.

9. An actuating device according to claim 8, wherein said liquid film or layer ~~is~~ comprises ~~a layer of~~ viscous oil or grease.

10. An actuating device according to claim 9, wherein the liquid film or layer ~~is~~ comprises ~~a layer of~~ damping grease.

11. An actuating device according to ~~any of the claims 1-10~~claim 1, further comprising an electronic circuit ~~for receiving~~ configured to receive the output signals from the force transducers and ~~for processing these~~ to process the output signals prior to transmitting them to the driving and steering system of the vehicle~~,~~ so as to obtain ~~substantially the same~~ vehicle movement of greater magnitude than if the vehicle ~~of the vehicle as if it~~ had been manually driven by the forces applied to the gripping means~~., but in an intensified scale.~~

12. A method ~~for~~ of manually actuating a driving and steering ~~means~~ mechanism for a wheeled, power driven object or vehicle, said method comprising:

applying a manual force to an actuating member~~,~~;

decomposing the manual force into at least two components extending in mutually intersecting, ~~predetermined~~ directions;~~,~~

applying each of said force components to a respective transducer;~~,~~ and

transmitting from each of said transducers to the steering ~~system~~ mechanism an output signal, ~~which is~~ responsive to the strength of the force component received by the transducer relating to the respective direction.

13. A method according to claim 12, wherein the manual force is applied to gripping means provided on the actuating member, ~~which is~~the actuating member being supported by a base member so as to be ~~freely~~ displaceable thereon ~~along a plane~~ in said ~~predetermined~~ directions within a plane.~~only.~~

14. A method according to claim 12~~ or 13~~, wherein said ~~predetermined~~ directions extend at ~~mutual~~ right angles.

15. A method according to ~~any of the claims 12 - 14~~claim 12, wherein one of said ~~predetermined~~ directions extends in the normal direction of travel of the vehicle.

16. A method according to ~~any of the claims 13-15~~claim 13, wherein the actuating member is ~~freely~~ configured to float~~ing~~ on a liquid film or layer.

17. A method according to claim 16, wherein said liquid film or layer ~~is a layer of~~ comprises viscous oil or grease.

18. A method according to claim 17, wherein the liquid film or layer ~~is a layer of~~comprises damping grease.

19. A method according to ~~any of the claims 12 - 18~~claim 12, wherein the transducer stiffness and the mass of the control plate ~~are combined so as to obtain~~define a natural frequency of resonance of the movable parts of the actuator device substantially exceeding frequencies of environmental vibrations.

20. A method according to claim 18~~ or 19~~, wherein the liquid layer is arranged so as to provide one of about critical ~~or~~ and about just overcritical damping of the natural free resonance vibrations.

21. A method according to ~~any of the claims 12-20~~claim 12, wherein the output signals from the transducers are configured to be transmitted to an electronic circuit, in which ~~these~~ the output signals are processed prior to further transmitting them to a driving and steering

system of a wheeled vehicle~~,~~ so as to obtain ~~substantially the same~~ vehicle movement of greater magnitude ~~of the vehicle as~~ than if ~~it~~the vehicle had been manually driven by the force applied to the actuating member~~.~~, ~~but in an intensified scale.~~

22. A drive wheel system ~~for supporting and driving~~ configured to drive an object, said wheel system comprising:

at least two separate wheeled units or bogies ~~to be~~ mounted at selected locations on the object to support the ~~same~~object, each wheeled unit or bogie ~~including~~ comprising:

a frame, wherein at least one wheel member is rotatably mounted ~~in relation~~ to the frame~~;~~,~~;~~

a driving ~~means~~ mechanism configured to rotate ~~for rotating~~ the wheel member~~(s)~~ ~~in relation~~relative to the frame~~;~~,~~;~~ and

a steering ~~means for moving~~ mechanism configured to move the wheel member~~(s)~~ ~~in desired directions in relation~~ relative to the frame~~;~~,~~;~~

an electronic control ~~means for controlling~~ unit configured to control ~~the function of~~ the driving mechanism and the steering mechanism ~~means~~ of each of said wheeled units or bogies, the electronic control unit comprising: ~~and including~~

a pre-programmed ~~bogie~~ control device at each of said wheeled units or bogies~~;~~,~~;~~

a signal transmitter; and ~~ing means, and~~

a pre-programmed central control unit ~~for outputting~~configured to output command signals to each of the pre-programmed ~~bogie~~ control devices via the signal transmitter~~ing means~~ in response to input command signals; and ~~received, and~~

an actuating device according to ~~any of the claims 1-11~~claim 1, the output signals generated by the transducers ~~-~~being configured to be transmitted to the electronic control unit.~~means.~~

23. A system according to claim 22, wherein the central control unit comprises a first programming ~~means for inputting~~ device configured to receive information about the mutual positions of the wheeled units or bogies on said object.

24. A system according to claim 22~~ or 23~~, wherein each bogie control device comprises a second programming ~~means for inputting~~device configured to recieve information about the orientation of the associated wheeled unit ~~in relation to~~ about a selected common axis~~, when mounted on said object.~~

25. A system according to ~~any of the claims 22 - 24~~claim 22, wherein the signal transmitter ~~ing means~~ comprises a galvanic isolating device.

26. A system according to claim 25, wherein the galvanic isolating device comprises an optocoupler.

27. A system according to ~~any of the claims 22 - 26~~claim 22, wherein the central control unit comprises ~~means for transforming~~a data converter configured to convert output command signals to be transmitted to the bogie control devices at the wheeled units or bogies into serial digital signals~~.strings.~~

28. A system according to ~~any of the claims 22 - 27~~claim 22, wherein the ~~electronics of the electronic control means is divided between the~~ central control unit ~~on the one hand~~ and each of the bogie control devices each comprise a portion of the electronic control unit~~.on the other hand so as to minimize data transmission via the signal transmitting means.~~

29. A system according to ~~any of the claims 22 - 28~~claim 22, wherein the driving mechanism and the steering mechanism ~~means~~ of the wheeled units or bogies each comprise a motors selected from the group consisting of electric motors, hydraulic motors, pneumatic motors, steam engines, thermodynamic engines, and internal combustion engines.

30. A system according to ~~any of he claims 22 - 29~~claim 22, wherein the wheeled units or bogies of the system are substantially identical.

31. A system according ~~to any of the claims 22 - 30~~claim 22, wherein each wheel member ~~is of the type comprising~~comprises a support member, a wheel element, and a drive shaft, the drive shaft ~~having a drive means~~ engaging a drive surface on the wheel element and is configured to rotatably drive the wheel element relative to the support member, the drive shaft ~~having~~ comprising a longitudinal axis, ~~and~~ wherein the engagement of the drive ~~means~~ shaft and the drive surface ~~defining~~ defines in vertical cross-section a line of engagement that is at an acute angle with respect to the longitudinal axis, the wheel element ~~having~~ comprising a surface contacting portion extending about its periphery and being positioned such that ~~it~~ the wheel

element is intersected by the line of engagement substantially at where ~~it~~ the wheel element contacts a supporting surface.

32. A system according to claim 31, wherein the drive shaft is substantially normal to the supporting surface.

33. A system according to claim 31 ~~or 32~~, wherein the ~~line of engagement is at an~~ angle ~~of~~ is between about 10° and about 25°. ~~to the substantially normal longitudinal axis of the drive shaft.~~

34. A system according to ~~any of the claims 31 - 33~~claim 31, wherein the support member ~~has~~ comprises a substantially hemispherical member ~~outer surface with~~ and the wheel element is rotatable about an axle extending normal to an inner surface of the hemispherical member.

35. A method of rendering an object self-propelling ~~by means of~~with a drive wheel system according to ~~any of the claims 24 - 34~~claim 24, said method comprising:

mounting at least two of said wheeled units or bogies on the object at selected locations thereof and with selected orientations ~~in relation~~relative to a certain direction;~~,~~

programming said first programming ~~means~~ device by inputting information about the ~~mutual~~ positions of the wheeled units or bogies on said object;~~,~~

programming said second programming ~~means~~ device by inputting information about the orientation of the associated wheeled unit ~~in relation~~ relative to a selected direction, and

inputting command signals to the central control unit ~~by means of~~from the actuating device so as to move the vehicle along a desired path.

36. A method according to claim 35, comprising ~~basing~~ relating the information about the ~~mutual~~ positions of the wheeled units or bogies ~~in relation~~ to an actual or imaginary co-ordinate system on said object.

37. A method according to claim 36, wherein said selected direction is parallel to one of the axes of the co-ordinate system.

38. A method according to ~~any of the claims 35 - 37~~claim 34, wherein the electronic control ~~means are~~ unit is pre-programmed to ensure that the steering ~~means are~~ mechanism moves~~ing~~ all wheel members of the wheeled units or bogies mounted on the ~~said~~ object such that

any time during driving all wheel members are either moving along substantially parallel lines or substantially concentric arcs of circles.

39. A method according to ~~any of the claims 35 – 38~~claim 35, wherein the command signals are transmitted from the central control unit to the ~~bogie~~ control devices at the wheeled units or bogies as serial digital signals.~~strings.~~

40. A method according to ~~any of the claims 35 – 39~~claim 35, wherein the object to be rendered self-propelled is a manually driven vehicle having a plurality of supporting wheels, wherein at least ~~some of these~~ two supporting wheels ~~being~~ are replaced ~~so as to have~~ such that the vehicle is supported by at least two of said wheeled units or bogies and freely swivelling wheels or casters only.

41. A method according to ~~any of the claims 35 – 40~~claim 35, wherein the ~~central~~ electronic control unit is mounted on the object.